Investigation on the durability of use fly ash and eggshells powder to replace the cement in concrete productions

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ABSTRACT:
Carbon emissions became one of the most significant issues that affect the environment leading to climate change and other environment problems. Concrete productions depend on cement as a main element. The manufacturing of cements produces high CO2 emission which is approximately 5-7% of total CO2 emission on earth. This paper will investigate the possibility of reducing the cement amount in concrete productions by replacing it partly with waste materials in the mixing design while maintaining acceptable quality of concrete strength and quality. Fly ash (FA) and eggshells powder (ESP) are the waste materials that are used for this research. The combination of FA and ESP between 35-45% has been used to replacement cement in the mix design. The replacement of cement with FA and ESP was conducted according to weight instead of volume. From the experimental, it is observed that cement replacement with 35% of fly ash and eggshells improved the compression strength and durability of the concrete as compared to the conventional concrete. In conclusion, replacing 35% in total (FA+ESP) instead of cement is an acceptable amount that can reduce the use of ordinary cement in construction applications.